GS748T Smart Switch Hardware Installation Guide

NETGEAR, Inc.
4500 Great America Parkway
Santa Clara, CA 95054 USA

202-10232-01
January 2007

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This equipment is in the first category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines that are aimed at preventing radio interference in commercial and/or industrial areas.

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NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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EN 55 022 Declaration of Conformance

This is to certify that the NETGEAR GS748T Gigabit Smart Switch is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55024 Class A (CISPR 22).

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This is to certify that the NETGEAR GS748T Gigabit Smart Switch is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class A (CISPR 22) and EN 55 024.

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Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (NETGEAR GS748T Gigabit Smart Switch) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

Customer Support

For assistance with installing and configuring your NETGEAR system or for questions or problems following installation:

- Check the NETGEAR Web page at http://www.NETGEAR.com/support
- Call Technical Support in North America at 1-888-NETGEAR. If you are outside North America, please refer to the phone numbers listed on the Support Information Card that was included with your switch.
- Email Technical Support at support@NETGEAR.com.
- Defective or damaged merchandise can be returned to your point-of-purchase representative.

Internet/World Wide Web

NETGEAR maintains a World Wide Web home page that you can access at the uniform resource locator (URL) http://www.NETGEAR.com. A direct connection to the Internet and a Web browser such as Internet Explorer or Netscape are required.

FCC Requirements for Operation in the United States

FCC Information to User This product does not contain any user-serviceable components and is to be

used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals

FCC Guidelines for Human Exposure This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Declaration Of Conformity We, NETGEAR, Inc., 4500 Great America Parkway, Santa Clara, CA 95054, declare under our sole responsibility that the model FS728TP: ProSafe™ 24 Port 10/100 Smart Switch with 4 Gigabit Ports and 24 Port PoE complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: a) This device may not cause harmful interference and b) This device must accept any interference received, including interference that may cause undesired operation."

Product and Publication Details

Model Number:	GS748T
Publication Date:	January 2007
Product Family:	Smart Switch
Product Name:	GS748T Gigabit Smart Switch
Home or Business Product:	Business
Language:	English
Publication Part Number:	202-10232-01
Publication Version Number:	1.0

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About This Manual

The *NETGEAR® GS748T Smart Switch™ Hardware Installation Guide* describes how to install, configure, and troubleshoot the GS748T Gigabit Smart Switch. The information in this manual is intended for readers with intermediate computer and Internet skills.

Conventions, Formats, and Scope

The conventions, formats, and scope of this manual are described in the following paragraphs:

- **Typographical Conventions.** This manual uses the following typographical conventions:

Italics	Emphasis, books, CDs, URL names
Bold	User input
`Fixed`	Screen text, file and server names, extensions, commands, IP addresses

- **Formats.** This manual uses the following formats to highlight special messages:

Note: This format is used to highlight information of importance or special interest.

Tip: This format is used to highlight a procedure that will save time or resources.

Warning: This is a warning of possible malfunction or damage to the equipment.

Danger: This is a safety warning. Failure to take heed of this notice may result in personal injury or death.

- **Scope.** This manual is written for the GS748T Smart Switch according to these specifications:

Product Version	GS748T Gigabit Smart Switch
Manual Publication Date	January 2007

Note: Product updates are available on the NETGEAR, Inc. website at *http://kbserver.netgear.com/products/GS748T.asp*.

How to Use This Manual

The HTML version of this manual includes the following:

- Buttons > and < for browsing forwards or backwards through the manual one page at a time.
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- A button to access the full NETGEAR, Inc. online knowledge base for the product model.
- Links to PDF versions of the full manual and individual chapters.

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Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

Revision History

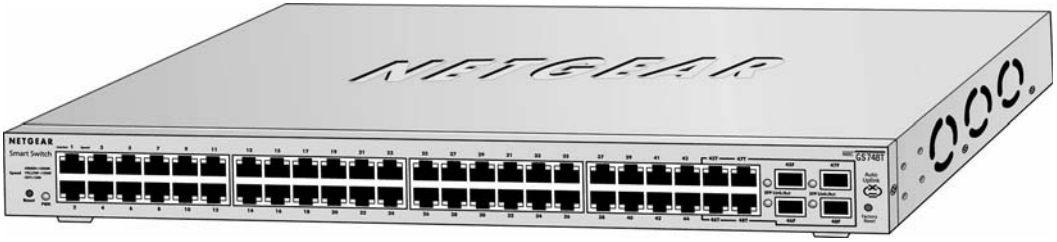
Document Part Number	Version Number	Description
202-10232-01	1.0	Document created

Chapter 1
Introduction

Congratulations on your purchase of the NETGEAR GS748T Gigabit Smart Switch! Your NETGEAR Switch is a state-of-the-art, high-performance, IEEE-compliant network solution designed for users who require a large number of ports and want the power of Gigabit connectivity to eliminate bottlenecks, boost performance, and increase productivity. There are 48 twisted-paired ports with 4 SFP GBIC slots on the front panel of the switch which support non-stop 10/100/1000 networks. To simplify installation, the switch is shipped ready for use out of the box.

This chapter provides the following information:

- Overview
- Switch Features
- Package contents



Overview

Your NETGEAR GS748T Gigabit Smart Switch provides 48 twisted-pair ports with four built-in Small Form Factor (SFP) GBIC slots that support nonstop 10/100/1000M fiber networks. Using these Gigabit slots, you can create high-speed connections to a server or network backbone. For example, you can:

- Connect switches to each other with high-speed links
- Link to high-speed servers
- Provide 10/100/1000 copper and fiber connectivity

Your GS748T Gigabit Smart Switch also provides the benefit of administrative management with a complete package of features for the observation, configuration, and control of your network. With a Web-based Graphical User Interface (GUI), the switch's many capabilities can be viewed and used in a simple and intuitive manner. There is also an easy to use switch management utility that runs on a PC. The switch's management features include configuration for port and switch information, VLAN for traffic control, port trunking for increased bandwidth, and Class of Service (CoS) for traffic prioritization. These features, and more, enable you better to understand and control your network.

Your NETGEAR GS748T Gigabit Smart Switch can be free-standing or rack-mounted in a wiring closet or equipment room. It is IEEE-compliant and offers low latency for high-speed networking. It includes 48 auto-sensing 10/100/1000 Ethernet ports with 4 SFP GBIC slots. All ports can automatically negotiate to the highest speed. This capability makes the switch ideal for environments that have a mix of Ethernet, Fast Ethernet, and Gigabit Ethernet devices. In addition, all 10/100/1000 Mbps ports operate in half- or full-duplex mode, increasing the maximum bandwidth of each connection to either 20 Mbps, 200 Mbps, or 2000 Mbps, respectively. The maximum segment length is 328 feet (100 meters) over Category 5 unshielded twisted-pair (UTP) cable.

Features

The following list identifies the key features of the NETGEAR GS748T Gigabit Smart Switch.

- Forty-eight 10/100/1000 Mbps auto-sensing Gigabit-Ethernet switching ports
- Four SFP GBIC combo Gigabit Ethernet slots for optional fiber connectivity
- Reset Button
- Factory Defaults Button
- Administrative switch management
  - IEEE 802.1Q Tag VLAN with up to 48 VIDs ranging in 2 to 4K
  - IEEE 802.1p QoS support, two priority queues per port
  - Port-based VLAN with up to 48 groups; any one port can belong to different VLAN groups
  - IEEE 802.3ad Link Aggregation support
  - Embedded HTTP server for Web-based management
  - Supports port-setting function, enabling user to enable/disable each port, and set speed, duplex mode and device flow control
  - Auto-Discovery support with application program for discovering and managing the smart switches on the network
  - Flash upgrade, configuration backup/restore, and factory reset
- Full compatibility with IEEE standards:
  - IEEE 802.3i (10BASE-T)
  - IEEE 802.3u (100BASE-TX)
  - IEEE 802.3z/ab (1000BASE-X, 1000Base-T)
  - IEEE 802.3x (full-duplex flow control)
- Auto-sense and auto-negotiate for all ports
- Auto Uplink on all ports for the right connection sense
- Integrated address Look-Up Engine supports 8K absolute MAC addresses
- Full- and half-duplex functions for all 10/100/1000 ports
- Store-and-Forward transmission to remove bad packets from the network
- Active flow control to minimize packet loss/frame drops:
  - Half-duplex back-pressure control

  - Full-duplex IEEE 802.3x pause frame flow control
- LED indicators for port status monitoring:
  - Power LED indicates power on/off status
  - Link/Act LED indicates link status and activity
  - SFP GBIC Link/Act LED indicates link status and activity
- Flexible installation:
  - Standalone desktop installation
  - 19-inch standard rack-mount
- Standard 1U case size

Package Contents

Figure 1-1 shows the package contents of the NETGEAR GS748T Gigabit Smart Switch.

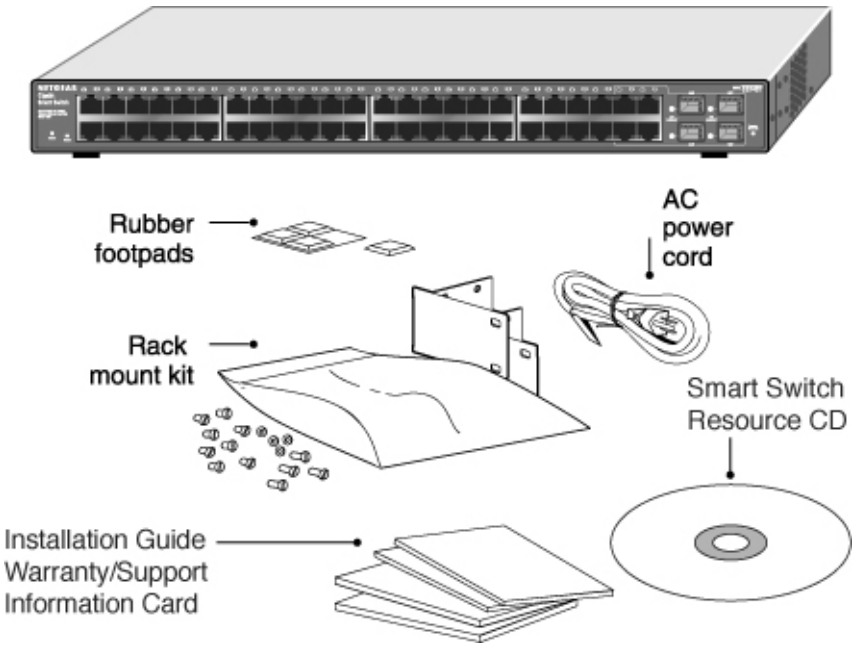


Figure 1-1 Package Contents

Verify that your package contains the following:

- GS748T Gigabit Smart Switch
- Rubber footpads for tabletop installation
- Power cord
- 19-inch rack-mount kit
- Installation guide
- Smart Switch Resource CD with Smart Wizard Discovery Utility, and Hardware and User's manuals
- Warranty/Support Information Card

If any item is missing or damaged, contact your point-of-purchase representative immediately.

Chapter 2
Physical Description

This chapter describes the hardware features of the NETGEAR GS748T Gigabit Smart Switch. Topics include:

- Front and back panels
- 10/100/1000 Mbps auto-sensing RJ-45 ports
- SFP GBIC Module bay
- LED descriptions
- Reset button
- Factory defaults button

Front and Back Panels

Figure 2-1 and Figure 2-2 show the key components on the front and back panels of the NETGEAR GS748T Gigabit Smart Switch.

Figure 2-1 GS748T Gigabit Smart Switch—Front Panel

Figure 2-2 GS748T Gigabit Smart Switch—Rear Panel

The front panel contains RJ-45 jacks with LEDs and 4 SFP GBIC module bays. The rear panel has a standard AC power receptacle for accommodating the supplied power cord.

10/100/1000 Mbps RJ-45 Ports

The 48 10/100/1000 Mbps, auto-sensing RJ-45 ports of the GS748T Gigabit Smart Switch are seen in Figure 2-1. When you insert a cable into one of these ports, the switch automatically determines the maximum speed (10 or 100 or 1000 Mbps) and the mode (half- or full-duplex) of the attached device. All ports support only unshielded twisted-pair (UTP) cable with an 8-pin RJ-45 plug connection.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink. This technology enables you to attach devices to the RJ-45 ports using either straight-through or crossover cables. When you insert a cable into one of these ports, the switch automatically:

- Detects whether the combination of attached device and network cable (normal or crossover) requires a normal connection (such as when connecting the port to a PC) or an uplink connection (such as when connecting the port to a router, switch, or hub).
- Configures the RJ-45 port to enable communications with the attached device without user intervention.

SFP GBIC Module

To enable you to have fiber connections on your network, there are four module bays which accommodate standard SFP GBIC modules, such as the AGM731F or AGM732F from NETGEAR. The module bays use combo ports which comprise respective shared connections with the last four RJ-45 ports, namely port 45T, 46T, 47T, and 48T. Only one type of connection of a combo port can be active at any time. For example, both port 45T and 45F cannot be used simultaneously. If both connectors of a combo port are made together, the fiber port (45F) is active.

The SFP GBIC bay accommodates a standard SFP GBIC module. This module has an LC connector that is compatible with the IEEE 802.3Z 1000 Base-SX Standard.

LED Descriptions

The front panel of the NETGEAR GS748T Gigabit Smart Switch comprises LEDs that provide a concise display of link, port speed, and activity. The following table summarizes the function of these LEDs.

Table 2-1. Front Panel LEDs

Label	Color	Activity	Description
Power	Green	On	Power is supplied to the switch
		Off	Power is disconnected
Speed/Link/ACT	Green	On	A valid 1000Mbps link is established on the port
		Blinking	Data transmission is occurring at 1000Mbps on the port
	Yellow	On	A valid 10/100Mbps link is established on the port
	None	Off	No 10/100/1000Mbps link is established on the port
SFP (MiniGBIC) Link/Act	Green	On	A valid 1000Mbps link is established on the port
		Off	No valid link is established on the port

Reset Button

The Reset button of the GS748T triggers a hardware reset of the switch. Figure 2-3 shows its location on the front panel. This action is equivalent to switching the unit power off and back on. The last saved configuration is loaded into the switch as it resets. To operate the reset button, insert a device such as a paper clip into the opening to press the recessed button. The front-panel LEDs should extinguish and light again as the switch performs its Power On Self Test (POST).

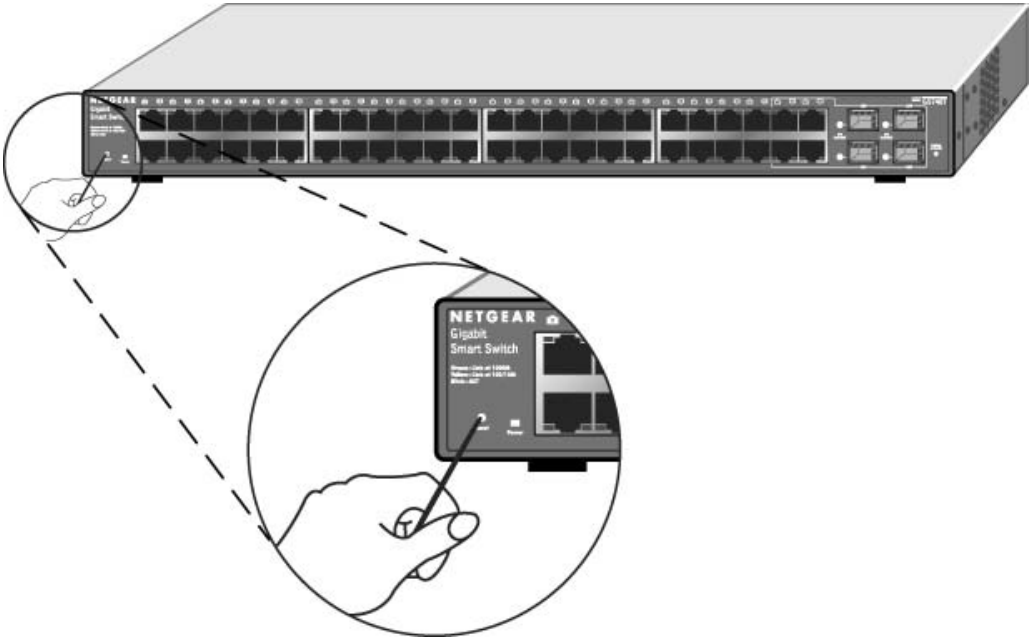


Figure 2-3 Reset Button of the GS748T Gigabit Smart Switch

Restore Factory Defaults Button

The Restore Factory Default button of the GS748T Smart Switch enables you to clear the current settings and return the switch to its factory default configuration. This function clears all settings, including the password, VLAN settings, and port configurations. To perform this operation, insert a device such as a paper clip into the opening to press the recessed button.

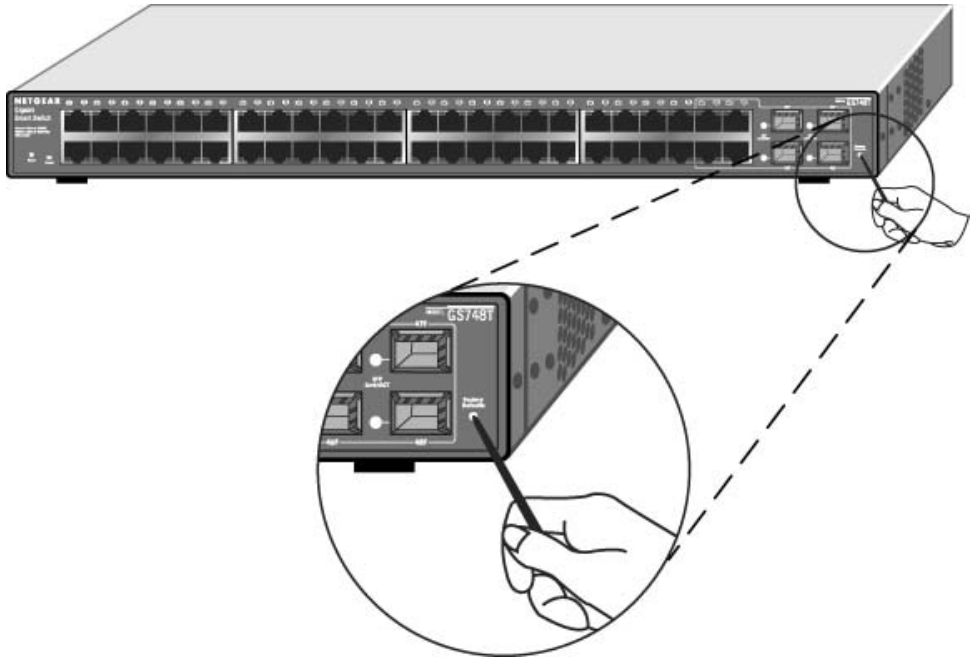


Figure 2-4 Restore Factory Defaults Button of the GS748T Gigabit Smart Switch

Chapter 3
Applications

Your NETGEAR GS748T Gigabit Smart Switch is designed to provide flexibility in configuring your network connections. It can be used as your only network traffic-distribution device or with added 10 Mbps, 100 Mbps, 10/100 Mbps, and 1000 Mbps hubs and switches. This chapter shows how the switch can be used in various network environments.

Topics include:

- Desktop switching
- Backbone switching

Desktop Switching

Your NETGEAR GS748T Gigabit Smart Switch can be used as a desktop switch in a small network that gives users 1000 Mbps access to a file server. With full-duplex mode enabled, the switch port connected to the server or PC can provide 2000 Mbps throughput.

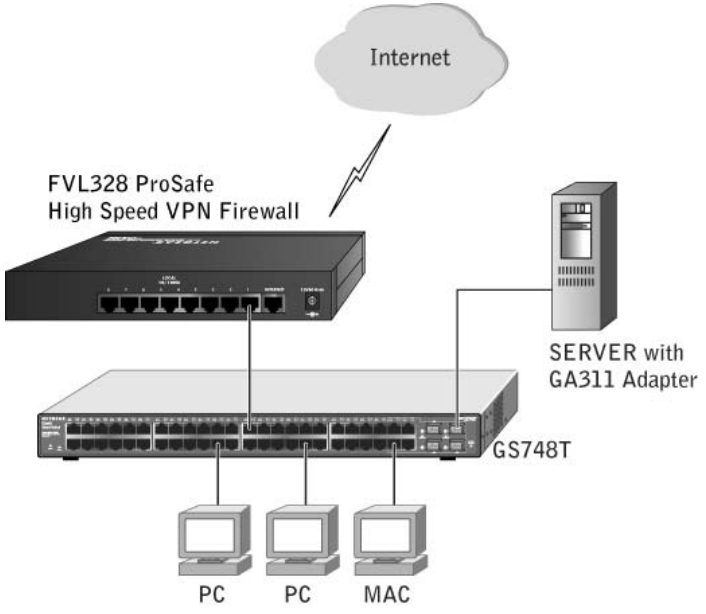


Figure 3-1 Example of Desktop Switching

Backbone Switching

You can use your GS748T Gigabit Smart Switch as a backbone switch in a small network that gives users high-speed access to servers and other network devices.

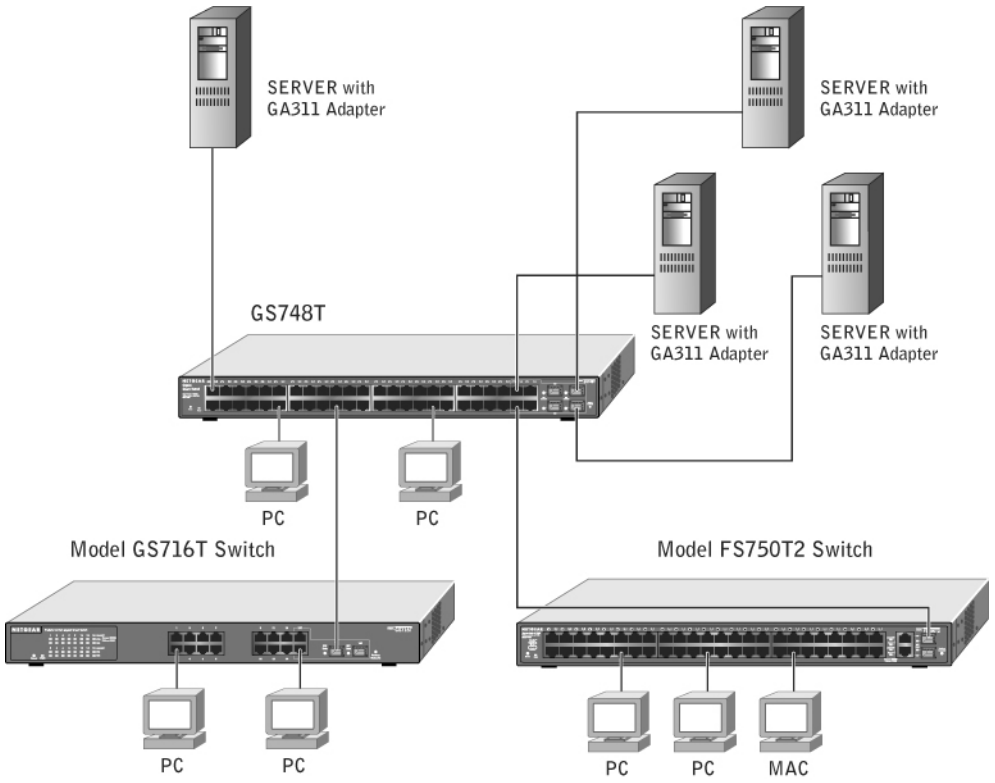


Figure 3-2 Example of Backbone Switching

Chapter 4
Installation

This chapter describes the installation procedures for your NETGEAR GS748T Gigabit Smart Switch. Switch installation involves the following steps:

1. Preparing the site
2. Installing the switch
3. Checking the installation
4. Connecting devices to the switch
5. Installing an SFP GBIC module
6. Applying AC power
7. Switching management through a Web Browser or Utility Program (initial configuration)

Step 1: Preparing the Site

Before you install your switch, ensure that your operating environment meets the environmental requirements in Table 4-1.

Table 4-1. Site Requirements

Characteristics	Requirements
Mounting	
Installations	Desktop: provide a flat table or shelf surface
	Rack-mount: use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You also need the rack-mount kit supplied with your switch.
Access	Locate the switch in a position that lets you access the front panel RJ-45 ports, view the front panel LEDs, and access power connector.
Power source	Provide a power source[a] within 6 feet (1.8 meters) of the installation location. Ensure that the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Environmental	

Table 4-1. Site Requirements (continued)

Temperature:	Install the switch in a dry area, with ambient temperature in the range 0–55ºC (32–131ºF). Keep the switch away from heat sources such as direct sunlight, warm air exhausts, hot-air vents, and heaters.
Operating humidity:	The installation location should have a maximum relative humidity of 90%, non-condensing.
Ventilation:	Do not restrict airflow by covering or obstructing air inlets on the sides of the switch. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling. Be sure there is adequate airflow in the room or wiring closet where you intend to install the switch.
Operating conditions:	Keep the switch at least 6 ft. (1.83 m) away from any source of electromagnetic noise, for example, a photocopy machine.

a. Power specifications for the switch are shown in Appendix B, “Technical Specifications”

Step 2: Installing the Switch

Install the switch using one of the following methods:

Installing the Switch on a Flat Surface

The switch ships with four self-adhesive rubber footpads. Attach one rubber foot pad into each of the four concave depressions on the base of the switch.

Note: These footpads cushion the switch against shock and vibration. They also provide for ventilation space between stacked switches.

Installing the Switch in a Rack

To install the switch in a rack, use the 19-inch rack-mount kit (supplied with your switch) with the following procedure (refer to Figure 4-1, “ Mounting the Switch in a Rack”):

1. Attach the supplied mounting brackets to the side of the switch using the screws provided in the rack-mount kit.
2. Tighten the screws with a #1 Phillips screwdriver to secure each bracket.
3. Orient the switch to align the unused mounting holes in the brackets with appropriate holes in the rack.

4. Support the weight of the switch and use four pan-head screws with nylon washers to attach it to the rack; use a #2 Phillips screwdriver to tighten the screws.

Figure 4-1 Mounting the Switch in a Rack

Step 3: Checking the Installation

Before you apply power, inspect the equipment thoroughly to:

- Verify that all cables are installed correctly.
- Check that cables are not damaged and that cable routing does not interfere with equipment to create a safety hazard.
- Ensure that all equipment is mounted properly and securely.

Step 4: Connecting Devices to the Switch

The following procedure describes how to connect devices to the switch's RJ-45 ports. Your NETGEAR GS748T Gigabit Smart Switch contains Auto Uplink technology, which enables you to attach devices using either straight-through or crossover cables.

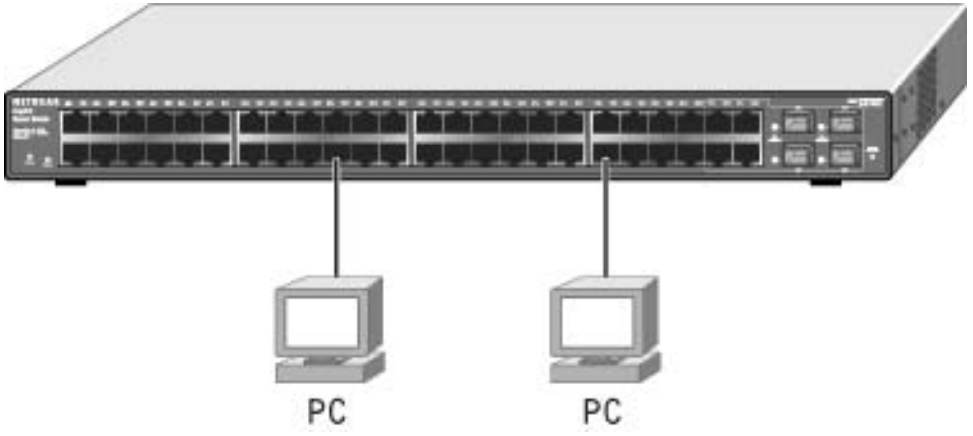


Figure 4-2 Connecting Devices to the Switch

Connect each device to an RJ-45 network port on the switch's front panel (see Figure 4-2) using a Category 5 (Cat5) unshielded twisted-pair (UTP) cable with RJ-45 connectors.

	Note: Ethernet specifications limit the cable length between the switch and the attached device to 100 m (328 ft.).

Step 5: Installing a SFP GBIC Module

The following procedure describes how to install an optional SFP GBIC module into one of the SFP GBIC module bays of the switch.

	Note: Contact your NETGEAR sales office to buy these modules. If you do not want to install a SFP GBIC module, skip this procedure.

To install a SFP GBIC module, insert the SFP module into the SFP GBIC module bay. Press firmly on the flange of the module to seat it securely into the connector.

You can install up to three additional Gigabit Ethernet modules using this procedure.

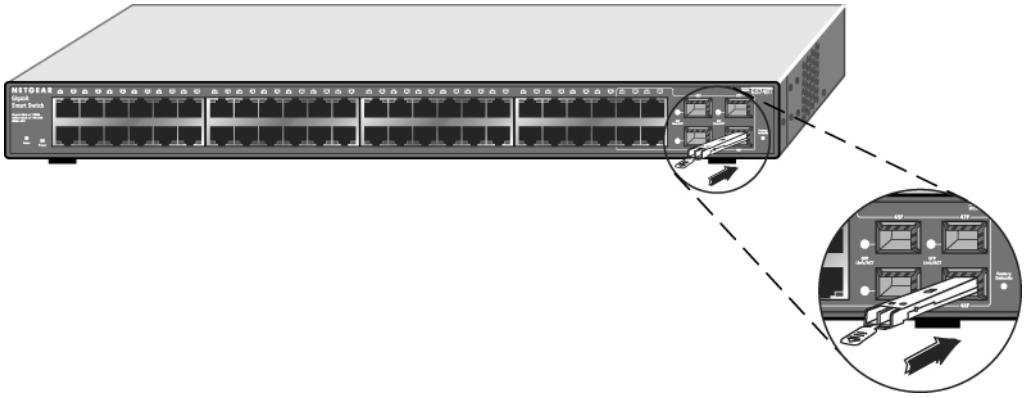


Figure 4-3 Installing a SFP GBIC Module into GS748T

Step 6: Applying AC Power

Because he NETGEAR GS748T Gigabit Smart Switch has no ON/OFF switch, AC power must be controlled by means of the IEC power cord connection. Select an appropriate unswitched, grounded AC facility outlet so as to avoid any future inadvertent power interruptions. Use the following procedure to apply AC power:

1. Connect the female end of the supplied IEC AC power adapter cable to the power receptacle on the back of the switch.
2. Connect the 3-pronged end of the AC power adapter cable to the AC outlet.

When you apply power, the green Power LED on the switch front panel illuminates.

	Note: If the Power LED does not light, check that the power cable is installed correctly and that the AC power supply is present. If this does not resolve the problem, refer to Appendix A, “Troubleshooting”.

Step 7: Management through a Web Browser or Utility Program (Initial Configuration)

Your NETGEAR GS748T Gigabit Smart Switch has embedded management software for viewing, changing, and monitoring its activity and configuration. You need not use this management software for it to function as a simple switch. However, the management software enables you to set up advanced features such as VLANs and Trunking and also enables you to configure the switch for improved efficiency and performance. As a result, you can improve the overall performance of your network.

After you power-up the switch for the first time, you can configure it using a Web browser or a utility program called Smartwizard Discovery. For more information about managing the switch, see the User Manual on the Smart Switch Resource CD.

Appendix A
Troubleshooting

This chapter provides information about troubleshooting the NETGEAR GS748T Gigabit Smart Switch. Information is supplied as:

- A Troubleshooting chart
- Additional troubleshooting suggestions

Troubleshooting Chart

Table A-1 lists symptoms, causes, and solutions of possible problems.

Table A-1. Troubleshooting Chart

Symptom	Cause	Solution
Power LED is off	No power is received	Check the power cord connections for the switch at the switch and the connected device Make sure all cables used are correct and comply with Ethernet specifications.
Link/ACT LED is off	Port connection is not working	Check the crimp on the connectors and make sure that the plug is properly inserted and locked into the port at both the switch and the connecting device. Make sure all cables used are correct and comply with Ethernet specifications. See Appendix D. Check for a defective adapter card, cable, or port by testing them in an alternate environment where all products are functioning.
File transfer is slow or performance degradation is a problem	Half- or full-duplex setting on the switch and the connected device are not the same	Make sure the attached device is set to auto negotiate.

Table A-1. Troubleshooting Chart (continued)

Symptom	Cause	Solution
A segment or device is not recognized as part of the network	One or more devices are not properly connected, or cabling does not meet Ethernet guidelines	Verify that the cabling is correct. Be sure all connectors are securely positioned in the required ports. Equipment may have been accidentally disconnected
Link/ACT LED is flashing continuously on all connected ports and the network is disabled	A network loop (redundant path) has been created	Break the loop by ensuring that there is only one path from any networked device to any other networked device

Additional Troubleshooting Suggestions

If the suggestions in Table A-1 do not resolve your problem, refer to the troubleshooting suggestions in this section.

Network Adapter Cards

Ensure that the network adapter cards installed in the PCs are in working condition and their most recent software drivers have been installed.

Configuration

If problems occur after altering the network configuration, restore the original connections and attempt to isolate the problem by implementing the most-recent changes, one step at a time. Make sure that cable distances, repeater limits, and other physical aspects of the installation do not exceed the Ethernet specification limitations.

Switch Integrity

If required, verify the integrity of the switch by resetting it. To do this, use the Tools> Reset command or remove AC power from the switch and then reapply it. If the problem persists, contact NETGEAR technical support. In North America, call 1-888-NETGEAR. If you are outside of North America, please refer to the support information card included with your product.

Appendix B
Technical Specifications

This appendix provides technical specifications for the NETGEAR GS748T Gigabit Smart Switch.

Network Protocol and Standards Compatibility

IEEE 802.3 10BASE-T

IEEE 802.3u 100BASE-TX

IEEE 802.3ab 1000BASE-T

IEEE 802.3z 1000Base-X

IEEE 802.3x flow control

Management

IEEE 802.1Q Static VLAN (Up to 256)

Port-based VLAN (Up to 48)

IEEE 802.1p Class of Service (CoS)

Port-based QoS (Port default priority; options: High/Normal/Low/Lowest)

Port Trunking - Manual as per IEEE802.3ad Link Aggregation

Port Monitoring

Interface

48 RJ-45 connectors for 10BASE-T, 100BASE-TX, and 1000BASE-T (Auto Uplink‘ on all ports) with 4 SFP GBIC module bays that share with 4 RJ-45 ports for fiber connectivity

LEDs

Per port (Gigabit): Speed/Link/Act

Per device: Power

Performance Specifications

Forwarding modes: Store-and-forward

Bandwidth: 96 Gbps

Network latency: Less than 20 microseconds for 64-byte frames in store-and-forward mode for 100 Mbps to 100 Mbps transmission

Buffer memory: 512 KB embedded memory per unit

Address database size: 8,000 media access control (MAC) addresses per system

Mean Time Between Failure (MTBF): 108,016 hours (~12 years)

Power Supply

Power Consumption: 90 W maximum

100–240VAC/50–60 Hz universal input

Physical Specifications

Dimensions (H x W x D): 1.7 x 17.3 x 12.2 in (43.2 x 440 x 305 mm)

Weight: 10.89 lb. (4.95 kg)

Environmental Specifications

Operating temperature: 0 to 55°C (32 to 131°F)

Storage temperature: -20 to 70°C (28 to 158°F)

Operating humidity: 90% maximum relative humidity, non-condensing

Storage humidity: 95% maximum relative humidity, non-condensing

Operating altitude: 3,000 m (10,000 ft.) maximum

Storage altitude: 3,000 m (10,000 ft.) maximum

Electromagnetic Emissions

CE mark, commercial

FCC Part 15 Class A

VCCI Class A

C-Tick

Electromagnetic Immunity

EN 55022 (CISPR 22), Class A

Safety

CE mark, commercial

CUL 60950 (Listed)/ EN60950 (Low Voltage Directive)page 3, see page 3, see

Modules

AGM731F 1000BASE-SX SFP GBIC for multimode fiber

AGM732F 1000BASE-LX SFP GBIC for single mode fiber

Appendix C
Glossary

Table C-1. Glossary

10BASE-T	The IEEE specification for 10 Mbps Ethernet over Category 3, 4, or 5 twisted-pair cable.
100BASE-FX	The IEEE specification for 100 Mbps Fast Ethernet over fiber-optic cable.
100BASE-TX	The IEEE specification for 100 Mbps Fast Ethernet over Category 5 twisted-pair cable.
1000BASE-SX	The IEEE specification for 1000 Mbps Gigabit Ethernet over fiber-optic cable.
1000BASE-T	The IEEE specification for 1000 Mbps Gigabit Ethernet over Category 5 twisted-pair cable.
Auto-negotiation	A feature that allows twisted-pair ports to advertise their capabilities for speed, duplex mode and flow control. When connected to a port that also supports auto-negotiation, the link can automatically configure itself to the optimum setup.
Auto Uplink	A feature that allows twisted-pair ports to sense if a normal (MDI-X) or uplink (MDI) connection is necessary and make the right link. It adjusts for straight-through or crossover cables.
Backbone	The part of a network used as a primary path for transporting traffic between network segments.
Bandwidth	The information capacity, measured in bits per second that a channel could transmit. Bandwidth examples include 10 Mbps for Ethernet, 100 Mbps for Fast Ethernet, and 1000 Mbps (I Gbps) for Gigabit Ethernet.
Baud	The signaling rate of a line, that is, the number of transitions (voltage or frequency changes) made per second. Also known as line speed.
Class of Service	A term to describe treating different types of traffic with different levels of service priority. Higher priority traffic gets faster treatment during times of switch congestion
Collision	A term used to describe two colliding packets in an Ethernet network. Collisions are a part of normal Ethernet operation, but a sudden prolonged increase in the number of collisions can indicate a problem with a device, particularly if it is not accompanied by a general increase in traffic.
Endstation	A computer, printer, or server that is connected to a network.

Table C-1. Glossary

Ethernet	A LAN specification developed jointly by Xerox, Intel and Digital Equipment Corporation. Ethernet networks transmit packets at a rate of 10 Mbps.
Fast Ethernet	An Ethernet system that is designed to operate at 100 Mbps.
Gigabit Ethernet	An Ethernet system that is designed to operate at 1000 Mbps (1 Gbps).
Fault isolation	A technique for identifying and alerting administrators about connections (such as those associated with switch ports) that are experiencing congestion or failure, or exceeding an administrator-defined threshold.
Forwarding	The process of sending a packet toward its destination using a networking device.
Filtering	The process of screening a packet for certain characteristics, such as source address, destination address, or protocol. Filtering is used to determine whether traffic is to be forwarded, and can also prevent unauthorized access to a network or network devices.
Flow control	A congestion- control mechanism. Congestion is caused by devices sending traffic to already overloaded port on a switch. Flow control prevents packet loss and temporarily inhibits devices from generating more traffic until the period of congestion ends.
Full-duplex	A system that allows packets to be transmitted and received at the same time and, in effect, doubles the potential throughput of a link.
Half-duplex	A system that allows packets to transmitted and received, but not at the same time. Contrast with full duplex.
IEEE	Institute of Electrical and Electronics Engineers. This American organization was founded in 1963 and sets standards for computers and communications.
IETF	Internet Engineering Task Force. An organization responsible for providing engineering solutions for TCP/IP networks. In the network management area, this group is responsible for the development of the SNMP protocol.
IP	Internet Protocol. IP is a layer 3 network protocol that is the standard for sending data through a network. IP is part of the TCP/IP set of protocols that describe the routing of packets to addressed devices.
IP address	Internet Protocol address. A unique identifier for a device attached to a network using TCP/IP. The address is written as four octets separated with periods (full-stops), and is made up of a network section, an optional subnet section and a host section.
LAN	Local Area Network. A network of endstations (such as PCs, printers, servers) and network devices (hubs and switches) that cover a relatively small geographic area (usually not larger than a floor or building).

Table C-1. Glossary

Loop	An event that occurs when two network devices are connected by more than one path, thereby causing packets to repeatedly cycle around the network and not reach their destination.
MAC	Media Access Control. A protocol specified by the IEEE for determining which devices have access to a network at any one time.
MAC address	Media Access Control address; also called hardware or physical address. Most devices that connect to a LAN have a MAC address assigned to them, as they are used to identify other devices in a network.
Port monitoring	The ability to monitor the traffic passing through a port on a device to analyze network characteristics and perform troubleshooting.
Port speed	The speed that a port on a device uses to communicate with another device or the network.
Port trunking	The ability to combine multiple ports on a device to create a single, high-bandwidth connection.
Protocol	A set of rules for communication between devices on a network.
Quality of Service	A term to describe delay, throughput, bandwidth, and other factors that measure the service quality provided to a user.
Segment	A section of a LAN that is connected to the rest of the network using a switch, bridge, or repeater.
SNMP	Simple Network Management Protocol. An IETF standard protocol for managing devices on a TCP/IP network.
Switch	A device that interconnects several LANs to form a single logical LAN that comprises of several LAN segments. Switches are similar to bridges, in that they connect LANs of a different type; however they connect more LANs than a bridge and are generally more sophisticated.
TCP/IP	Transmission Control Protocol/Internet Protocol. This is the name for two of the most well-known protocols developed for the interconnection of networks. Originally a UNIX standard, TCP/IP is now supported on almost all platforms, and is the protocol of the Internet. TCP relates to the content of the data traveling through a network — ensuring that the information sent arrives in one piece when it reaches its destination. IP relates to the address of the endstation to which data is being sent, as well as the address of the destination network.
Traffic prioritization	Giving time-critical data traffic a higher quality of service over other, non-critical data traffic.
VLAN	Virtual LAN. A logical association that allows users to communicate as if they were physically connected to a single LAN, independent of the actual physical configuration of the network.

NETGEAR, Inc.
4500 Great America Parkway
Santa Clara, CA 95054 USA

January 2007